



THE CAGE CULTURE OF *MACROBRACHIUM ROSENBERGII* IN THE KHARLAND PONDS OF RATNAGIRI, MAHARASHTRA, INDIA

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Abstract:

The kharland is a saline land in which affected with sea water. It is found in the Konkan region of Maharashtra, India. The cage culture of *Macrobrachium rosenbergii* was carried out in the kharland ponds, located in the campus of college of Fisheries, Shirgaon, Ratnagiri during August, 2001 to October, 2001. For the cage culture purpose, the cages were prepared by nylon net and PVC pipes, stocked in the kharland ponds. Each pond is a small and rectangular shaped water body with an area of 0.045 ha.(30 m x 15 m) and a depth of 1.5 meter. Seed of *Macrobrachium rosenbergii* was purchased from the Marine Biological Research Station, Pethkilla, Ratnagiri and stocked in the kharland ponds. The experiment was done in two phases, viz., Nursery Phase and Culture Phase. The period of each phase was 45 days. Better growth and survival was recorded in both the phases. There was no significant difference in length and weight attained by the prawns in cages ($P < 0.05$). The cage culture of *Macrobrachium rosenbergii* was successful in the kharland ponds but requires more practices.

Keywords: *Macrobrachium rosenbergii*, Cage culture, Kharland ponds, Ratnagiri.

Introduction

The culture of prawns in cages is a promising aquaculture technology that has already proven itself in many Asian countries. Cage culture has advantages over other aquaculture systems that are potentially important in terms of uptake by rural poor and landless people. Prawn farming is currently one of the most important sector of the national economy and during the last three decades, its development attracted considerable attention for its export potential. The steadily increasing cost of operations in the aquaculture practice has necessitated to develop more economically viable method for the culture of prawns and fishes. The method using for cage culture is considered as a productive culture system for the *Macrobrachium rosenbergii*. The main purpose of this study was to standardize the culture technique of *Macrobrachium rosenbergii* in the ponds of kharland region of Maharashtra, India. During this study, both pond and cage culture of *Macrobrachium rosenbergii* was taken up on the experimental basis.

Many people had worked on the culture of *Macrobrachium rosenbergii* at national and inter-national level. These includes Issac and Siddharaju (1983), Cook *et al.*, (1984), Sagi *et al.*, (1986), Shanmugam *et al.*, (1998), New (1990), Marque *et al.*, (2000 & 2010), Sidik *et al.*, (2008), Purshothama, *et al.*, (2011), Gouder (2012), Nakorn and Jintasatporn (2012), Mishra (2013), Kole (2014), etc. It was found that location of cages influence on the growth, survival and production of *Macrobrachium*

rosenbergii. The stocking density is also effects on the survival and growth of *Macrobrachium rosenbergii*. It should be optimum for higher yield. According to Marque *et al.*, (2010) the higher density of *Macrobrachium rosenbergii* in cages shows the better survival during nursery phase. Now it is well established that *Macrobrachium rosenbergii* is the best among the cultivable freshwater prawns.

No work had been done on the cage culture of *Macrobrachium rosenbergii* in the ponds of kharland region and hence, this study was taken for understanding the growth of prawns *Macrobrachium rosenbergii* in cages during nursery and culture phases.

Material and methods

The kharland is a saline land in which affected with sea water. It is found in the Konkan region of Maharashtra, India. The kharland ponds are located in the campus of College of Fisheries, Shirgaon, Ratnagiri at 16°59'10"N latitude 73°16'25" N longitude. There are total six ponds in 0.002 hectare area. Each pond is small and rectangular shaped water body of size 0.045 ha. (30 m x 15 m) and depth 1 meter. The cage culture of *Macrobrachium rosenbergii* was carried out in a pond (Pond No.6) during August, 2001 to October, 2001 (3 months period). The area of each cage was 0.5 m² erected in a pond (Pond No, 6). The water depth of the pond was 1 meter. The cages were made from PVC pipe and nylon net along with floaters. The experiment was conducted in two phases, viz., Nursery

phase and Culture phase. The post larvae of *Macrobrachium rosenbergii* was collected from the Marine Biological Research Station, Pethkilla, Ratnagiri. The cages were arranged in a pond with the help of a string attached to the bamboo poles. The distance between two cages was 1 meter. During the nursery phase, the post-larvae were fed with 'Avanti' brand commercial shrimp feed and chicken waste in culture phase @ 10% of the biomass. During nursery phase, the feed was given three times and two times in culture phase. The weekly maintenance of cages were done regularly. The sampling was done after every 15 days and noted their increase in length, weight and survival percentage.

Result

The cage culture of *Macrobrachium rosenbergii* was performed in nursery and culture phase for the period of 45 days each. Details are as follows:

A. Nursery phase: In the nursery phase, 300 post-larvae of *Macrobrachium rosenbergii* were stocked. Their average initial length was 11.00 ± 3.14 mm in cage A and 11.00 ± 3.04 mm in cage B. After 45 days, the prawns had attained final length of 26.5 ± 8.5 in cage A and 25.5 ± 6.5 mm in cage B, respectively. Similarly, the initial weight (mg) was 13.00 ± 4.12 in cage A and 13.00 ± 2.1 in cage B. The prawns had attained final weight as 137.00 ± 2.5 in cage A and 150.00 ± 12.00 in cage B. The specific growth rate per day was 0.05 in cage A and 0.06 in cage B. Their survival percentage was 72.66 % in cage A and 79.66 % in cage B. The culture period was of 45 days. There was no significant difference in the increase in length of the *Macrobrachium rosenbergii* ($P < 0.05$). (Table 1).

B. Culture phase: The prawn *Macrobrachium rosenbergii* grown in nursery phase was stocked in the culture phase for 45 days again. Total 60 prawns were stocked (30 in each cage). Their average initial length was 26.5 ± 8.5 mm in cage A and 25.5 ± 6.5 mm in cage B. Prawns had attained final length 37.0 ± 0.46 mm in cage A and 40.02 ± 0.38 in cage B. Similarly, the initial weight (mg) was 140.00 ± 2.5 in cage A and 150.00 ± 12.00 in cage B. The prawns had attained final weight (mg) as 660.00 ± 0.26 in cage A and 760.00 ± 0.14 in cage B. The Specific growth rate of prawns per day was 0.025 in cage A and 0.027 in cage B. Their survival rate was 90% in cage A and 86.6 % in cage B. Culture period was 45 days. There was no significant difference in the length and

weight attended by these prawns in cages A and B ($P < 0.05$). (Table 2).

Discussion

The cage culture of *Macrobrachium rosenbergii* in the kharland ponds of Ratnagiri was found to be successful in this area. In both nursery and culture phase, the survival rate of prawns was very high. i.e., 72.66 % and 90.00 %. There was also increase in length and weight of the prawns. For both the phases, total duration was of 90 days. During the period of study, it was observed that *Macrobrachium rosenbergii* grows very rapidly under optimum and intensive culture practice. Ling (1969) reported that prawns of size 55 mm could grow up to 225 mm along with weight 125 grams in six months period when good food and proper conditions were provided. Cuvin-Aralar *et al.*, (2011) reported that higher stocking density affects on the growth and survival of prawns which results into higher mortality. Therefore, he suggests the moderate stocking density for higher yield and better survival of prawns. Similarly, Huang *et al.* (2012) reports that monsoon also affects on the water quality of the cages too. The successful attempt of rearing and culture of post-larvae of *Macrobrachium rosenbergii* in cages have been made by Fujimora and Okamoto (1970), Sandifer and Smith (1975), Sandifer *et al.* (1983), Reddy *et al.* (1993) etc. Aflalo *et al.* (2006) observed that the males of giant freshwater prawn *Macrobrachium rosenbergii* grows faster and reach higher weight at harvest than the female prawns. Their result is significant for many aquaculture species. It was found that the freshwater prawn farming plays an important role in the national economy, earning valuable foreign exchange and contributing to increase food production. Thus, prawn farming of freshwater prawn *Macrobrachium rosenbergii* has bright future. For successful cage culture of *Macrobrachium rosenbergii* requires good quality water, post-larvae, feed and management resources.

Conclusion

From this study, it may be concluded that the kharland ponds may be utilize for the polyculture of fishes and prawns in cages.

Table 1: Nursery phase of *Macrobrachium rosenbergii*.

Sr. No.	Parameters	Cage A	Cage B
1	Area of cage (m ²)	0.5	0.5
2	Stocked prawns (No.)	300	300
3	Initial length (mm)	11.00 ± 3.14	11.00 ± 3.04
4	Final length (mm)	26.5 ± 8.5	25.5 ± 6.5
5	Initial weight (mg)	13.00 ± 4.12	13.00 ± 2.1
6	Final weight (mg)	137.00 ± 2.5	150.00 ± 12.00
7	Specific growth rate per day (%)	0.05	0.06
8	Harvested prawns (No.)	239	218
9	Survival %	72.66	79.66
10	Culture period (days)	45	45

Table 2: Culture phase of *Macrobrachium rosenbergii*.

Sr. No.	Parameters	Cage A	Cage B
1	Area of cage (m ²)	0.5	0.5
2	Stocked prawns (No.)	30	30
3	Initial length (mm)	26.5 ± 8.5	25.5 ± 6.5
4	Final length (mm)	37.00 ± 0.46	40.02 ± 0.38
5	Initial weight (mg)	140.00 ± 2.5	150.00 ± 12.00
6	Final weight (mg)	660.00 ± 0.26	760.00 ± 0.14
7	Specific growth rate per day (%)	0.025	0.027
8	Harvested prawns (No.)	27	26
9	Survival %	90	86.6
10	Culture period (days)	45	45

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